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Fostering compliance in preschool-aged children using least-to-most assistive prompt hierarchy

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FOSTERING COMPLIANCE IN PRESCHOOL-AGED CHILDREN USING LEAST-TO-MOST ASSISTIVE PROMPT HIERARCHY

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ABSTRACT

Previous research has shown that prompting can increase child compliance to adult directives (Tarbox, Wallace, Penrod, & Tarbox, 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006). The purpose of this study was to train teachers to use prompting to increase child compliance to teacher directives. This study builds on the current literature by using least-to-most prompting (Horner & Keilitz, 1975) within the naturally occurring context of the preschool classroom. The participants consisted of 3 preschool teachers who interacted with a target child in an early childhood classroom. Child compliance was measured during free choice center time. Results were consistent with previous research (Tarbox, Wallace, Penrod, & Tarbox, 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006) by showing that the implementation of the least-to-most prompting intervention was correlated with an increase in child compliance.

CHAPTER 1: INTRODUCTION

Early childhood education programs provide children a safe space to practice new skills such as language, conflict resolution, and forming friendships (Odom & Wolery, 2003; McClelland, Morrison, & Holmes, 2000; Wayne, DiCarlo, Burts, & Benedict, 2007). Classrooms should be set up in such a way that children have a choice of materials to interact with and the teacher facilitates children's learning by introducing new materials and providing the uses for the materials (Odom & Wolery, 2003). Classrooms that are set up in a developmentally appropriate way are ideal environments for young children to learn and practice newly acquired skills (Copple & Bredekamp, 2009). Developmentally appropriate practices are a set of standards that encourages teachers to meet children's individual needs and set high yet realistic standards for children to assist in their learning and development (Copple & Bredekamp, 2009). Developmentally appropriate classrooms can allow children to practice social skills and allow teachers to mediate interactions for children that may struggle with their peer interactions (Copple & Bredekamp, 2009; Odom & Wolery, 2003). Classrooms that do not allow time for children to practice their social and conflict resolution skills may have children that struggle later in life with loneliness, aggression, or peer rejection (Buhs & Ladd, 2001; McClelland, Morrison, & Holmes, 2000).

Statement of the Problem

In order for children to succeed in early childhood classrooms they need to be able to use materials in a meaningful way as well as work cooperatively with their peers and teachers (Copple & Bredekamp, 2009; Odom & Wolery, 2003). Teachers can mediate peer interactions in order to teach children appropriate ways of talking and resolving conflicts with peers (Odom & Wolery, 2003; McClelland, Morrison, & Holmes, 2000). For example, teachers can assist

children in using words, rather than actions to express their feelings. Children that are noncompliant and do not correctly respond to teacher directives may miss out on important social and academic skills (Austin & Agar, 2005). Compliance in the classroom is important because the teacher is assisting the child with necessary social skills. A child that exhibits noncompliance may not learn these skills.

Background

Children learn many social skills in early childhood classrooms such as appropriate ways to interact with peers and teachers, including how to negotiate, take turns, and manage conflicts. Mastering these behaviors allows children to form bonds with other children and adults (Buhs & Ladd, 2001; McClelland, Morrison, & Holmes, 2000). Positive interactions help to build children's self images and to see themselves as effective (Buhs & Ladd, 2001). Teachers can mediate interactions and help children to form bonds with their peers (Odom & Wolery, 2003). Friendships allow children more opportunities to practice appropriate social skills, such as talking to and resolving conflicts with peers, as well as academic skills through the modeling of other children's play behavior (Rubin, Coplan, Chen, Buskirk, & Wojslawowicz, 2005). The teacher can facilitate these processes for children by providing directions to guide both their observational behaviors (McGee & Daly, 2007), as well as providing direct instruction on these skills (Alberto & Troutman, 2009).

Lack of social skills can lead to both short-term and long-term consequences for young children and can have either externalizing effects (child acts out) or internalizing effects (child withdrawals). In the short-term, lack of social skills has been linked in the literature with negative peer interactions, which can lead to rejection, bullying, or loneliness (Buhs & Ladd, 2001; Rubin, Coplan, Chen, Buskirk, & Wojslawowicz, 2005). Long-term externalizing effects

of peer rejection include delinquency, conduct disorder, and substance abuse (Rubin et al., 2005). Internalizing effects of peer rejection include depression, anxiety, and loneliness (Buhs & Ladd, 2001; Rubin et al., 2005). Teachers should help children to practice their social skills so that children do not experience long-term effects that are seen during adolescence and adulthood.

Research has shown that prompting can increase child compliance to adult directives (Tarbox, Wallace, Penrod, & Tarbox, 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006). Children's receptive language develops around the age of 12 months for simple one-step directions and around 18 months for simple two-step directions, meaning typically developing children have the ability to comply with adult directives by 18 months (MacWhinney, 2005). Least-to-most prompting (Horner & Keilitz, 1975) is a guidance technique that teachers can use when children need assistance in completing a teacher's directive (Tarbox et al., 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006; Wolery & Gast, 1984). This prompting strategy provides the child with the least amount of assistance needed for them to complete a directive. Wait times are included between increasing prompts to allow for children to process the directive and initiate the behavior. Praise is used as reinforcement when the child completes the directive.

Importance of the Area of Research

Children who fail to comply with adult directives miss learning opportunities. Teachers provide assistance to children in the acquisition, fluency, and maintenance of both social and academic skills; therefore, compliance to teacher directives is critical. Previous research has shown that training teachers to use guidance techniques has been effective in positively altering child behaviors (Stephenson & Hanley, 2010; Tarbox et al., 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006).

Research in this area is important because children who cannot comply with adult directives may find it more difficult to learn from the materials in the classroom and to establish peer relationships. The No Child Left Behind Act of 2001 (NCLB) calls for the use of evidence-based practices with children (Department of Education, 2002). Previous research has evidenced that teachers can learn least-to-most prompting techniques and successfully implement them throughout the daily routines in their classrooms (Stephenson & Hanley, 2010; Tarbox et al., 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006). Because previous research links positive social and academic outcomes for young children who comply with teacher facilitation, increasing child compliance with teacher directives is desirable (Odom & Wolery, 2003).

Research Questions

Prompting techniques have been used in research studies to increase compliance of preschool-aged children to teacher directives (Godby, Gast, & Wolery, 1987; Stephenson & Hanley, 2010; Tarbox et al., 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006). This study builds on the current literature by using least-to-most prompting (Horner & Keilitz, 1975) with a typically developing child within the naturally occurring context of the preschool classroom. The specific research questions for this study are: (a) Can teachers implement least-to-most assistive prompt hierarchy with fidelity within the context of the preschool classroom? (b) Does least-to-most prompting increase child compliance in a preschool-aged child? The research questions are guided by B.F. Skinner's theory of behaviorism, specifically the use of reinforcement in operant conditioning.

Conceptual Framework

Reinforcement. B.F. Skinner (1987) studied behavior and determined that consequences of behavior had more of an effect in shaping behavior than antecedents. He termed the process

operant conditioning, where rewards and punishments shape a person's behavior. Operant conditioning can be used by teachers in classrooms to reinforce children's positive behaviors. Teachers can use attention and verbal praise as positive reinforcers. Skinner (1987) discourages the use of punishment for negative behaviors because it produces short-term results. The application of reinforcement-based techniques has a long history in schools (CITE). Reinforcement-based procedures have distinct advantages over reductive (punishment) techniques including the development of new behaviors (CITE), the decreased likelihood of escape and avoidance toward the punisher (CITE), and an increased likelihood that the target behavior will maintain and generalize (CITE). Also, reinforcement techniques may have greater social acceptance and validity than other approaches to changing child behavior.

Experimental Design

Single-subject research design was used to examine the effects of teacher directives and a child's compliance to directives. Single-subject research is different from quantitative studies in that it compares individuals to themselves rather than to a larger group (Kazdin, 1982). In this study, single-subject research will be used to compare teacher behavior (directives) and child behavior (completion of directives) before and during the least-to-most prompting intervention and then again during a follow-up probe. Individual performance is compared before and during the intervention.

A multiple baseline design was used to measure the least-to-most prompting intervention across three teachers. Child compliance to teacher directives will be measured across the three teachers and once baseline data is stable, the intervention (least-to-most prompting) will be introduced by one teacher while the others continue baseline data (Cooper, Heron, & Heward, 2007; Kazdin, 1982; Lane, Wolery, Reichow, & Rogers, 2007). Once the intervention data are

stable and show a positive effect, the intervention will be introduced to the second teacher and finally the third teacher (Alberto & Troutman, 2009; Baer, Wolf, & Risley, 1968; Cooper, Heron, & Heward, 2007).

Limitations. There are some limitations with a single-subject research design. The first is that the results are not generalizable to a larger population until the same intervention is implemented with similar children and is still found effective. A second limitation is that the data collection process can be time-consuming. A final limitation of single-subject research is that the presence of an observer may affect both the teachers and children's behavior (Alberto & Troutman, 2009; Wolery & Dunlap, 2001).

Assumptions

The following assumptions guide the study:

1. Child compliance, as defined in the study, is a desirable outcome for students.
2. The instruments that are used in the study are appropriate for measuring the variables of interest in preschool children.
3. The data collected in the study is valid and reliable.

Summary

Child compliance to teacher directives is important because it is a mechanism by which children learn appropriate academic and social skills. Least-to-most prompting is an evidence-based practice that has a demonstrated track record of increasing child compliance (Godby, Gast, & Wolery, 1987; Horner & Keilitz, 1975; Stephenson & Hanley, 2010; Tarbox et al., 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006). Research has demonstrated that reinforcement, such as praise, can increase the likelihood of behavior that precedes it (Alberto & Troutman, 2009; Skinner, 1987), which in this study is compliance to teacher directives.

Therefore, least-to-most prompting will be followed with a praise statement regarding child completion of a teacher directive. Recommended practice suggest that skills be taught in the environment where they are to be used (Alberto & Troutman, 2009), which in this case is the preschool classroom, necessitating the use of a single-subject research design.

CHAPTER 2: LITERATURE REVIEW

Introduction

Through adult-child interactions, such as parent-child and teacher-child, children learn a variety of social and academic skills (Austin & Agar, 2005; Odom & Wolery, 2003). It is critical that children follow adult directives in order to learn important skills. Preschool can be a challenging time for children as they begin learning appropriate ways to interact with their peers and often need the assistance of adults. Preschool is also a time when children are learning to regulate their emotions and need adult assistance to use words rather than their bodies to express their emotions (Austin & Agar, 2005). Therefore, determining factors that contribute to increased child compliance to teacher directives would be beneficial to a child's development and an important contribution to the literature. A review of the literature was conducted to determine how compliance has been defined in the literature, problems associated with lack of child compliance, and factors that contribute to child compliance.

Definitions of Compliance and its Importance

Several studies have attempted to define *compliance*. Common language used across definitions includes the completion of a demand request within a specified amount of time (Austin & Agar, 2005; Tarbox et al., 2007; Wilder & Atwell, 2006). Compliance to teacher directives is important because teachers are trying to assist children is learning social and academic skills. Teachers should have clear and consistent rules and expectations for all children in their classrooms (Copple & Bredekamp, 2009). Consistency can minimize the incidences of misbehavior because children know what is expected of them and the consequences for not following the rules (Copple & Bredekamp, 2009; Saifer, 2003).

Children who act out and are noncompliant require the teacher to take time out of the routine to address the inappropriate behavior. Compliance to teacher directives in a preschool classroom is not only important for the target child who could benefit from the instruction, but children who are noncompliant can be disruptive to the daily routines established by teachers and take time away from other children who may need assistance (Austin & Agar, 2005; Crowther, Bond, & Rolf, 1981). This can cause a distraction for the teacher and the other children in the classroom. When the teacher has to take time to address the noncompliant behavior, she also takes time away from the other children's learning (Austin & Agar, 2005; Crowther, Bond, & Rolf, 1981). Noncompliant behavior should be dealt with quickly and effectively so that other children do not suffer from one child's noncompliance (Alberto & Troutman, 2009).

Summary. Compliance has been defined as completion of a verbal prompt within a certain period of time. Compliance to teacher directives is important because it allows for optimal learning in preschool classrooms. Noncompliance does not just make learning more difficult for the child exhibiting noncompliance, but other children in the environment may suffer as well due to the constant requirement of the teacher's attention to deal with the noncompliance, rather than teaching new skills to the other children. Children that exhibit noncompliance may take away from other children's learning opportunities because the teacher needs to address the noncompliance. When teachers have the knowledge and skills to address their children's needs they can foster compliance in their classrooms.

Factors Associated with Noncompliance

There are many reasons a child may exhibit noncompliance. A child might have increased noncompliant behavior when he is sick, when he is experiencing a life stressor (birth, death, move, divorce), or in the presence of a disability. A child's temperament can influence

the experience the child has with adults and may be related to a child's compliance; his temperament may clash with that of the teacher or may cause him to be somewhat difficult. Some children may exhibit noncompliant behavior because of a skills deficit and may require additional assistance. Some children lack self-regulation to the degree that when they become upset, they engage in what is termed *severe noncompliance*. Severe noncompliance is a more extreme form of noncompliance where children do not follow adult directives and may also harm themselves or others during their noncompliant actions (Ducharme & DiAdamo, 2005; McComas, Wacker, Cooper, Peck, Golonka, Millard, et al., 2000). Noncompliance can be associated with a child's temperament, skills deficit, or severe noncompliance; regardless of the reason for noncompliance, it should be addressed by the adults in the child's life.

Temperament. An infant's temperament can be influenced by both heredity and the infant's experiences with the external world. Infants' temperaments can be shaped either positively or negatively by experiences with the environment (Lamb, Bornstein, & Teti, 2002). Difficult temperament is defined as the expression of negative emotions, such as hard to soothe, irritable, or more likely to be distressed (Burney & Leerkes, 2010; Lamb, Bornstein, & Teti, 2002). The characteristics of an infants' difficult temperament can influence the way a caregiver reacts to the infant. The caregiver's reactions further influence how the infant acts and develops (Crockenberg & Leerkes, 2005). Infants with difficult temperaments influence others' reactions, but others' reactions can also influence the infants' temperament, later developmental outcomes, and later adjustment (Bradley & Corwyn, 2008; Gilissen, Bakermans-Kranenburg, van IJzendoorn, & van der Veer, 2008).

Infants' with difficult temperaments may be more likely to experience later behavior problems such as internalizing and externalizing behavior problems at 2 ½-years-old than infants

with less difficult temperaments (Crockenberg & Leerkes, 2005). Impulsivity and anger are positively related to externalizing behavior problems, such as disruptive or aggressive behaviors, while fear is positively related to internalizing behavior problems, such as anxiety and depression (Karreman, de Haas, van Tuijl, van Aken, & Deković, 2010). Research has suggested that higher levels of maternal sensitivity and more opportunities to be active can moderate externalizing behavior in children with difficult temperaments (Stright, Gallagher, & Kelley, 2008).

Infants with difficult temperaments may be more influenced by parental reactions than infants with less difficult temperaments (Gilissen et al., 2008). Infants who have difficult temperaments and have mothers that give emotional support and encourage autonomy have better academic achievement, social skills, and relationships with teachers and peers in first grade than infants with less support from their mothers (Stright, Gallagher, & Kelley, 2008). At 4- and 7-years-old children that were born with difficult temperaments but had positive interactions with their mothers are less likely to respond fearfully to fear-inducing film clips than children that had negative interactions with their mothers (Gilissen et al., 2008). Karreman et al. (2010) found that when parents are sensitive, set limits, and have structured environments, their children are more likely to exhibit self-regulation and compliance.

Children's temperamental difficulties can be mediated by caregivers' reactions to the children. It is important that caregivers remain calm and positive in their interactions with children that exhibit noncompliance in order for the children to have positive reactions to their caregivers. (Bradley & Corwyn, 2008; Gilissen, Bakermans-Kranenburg, van IJzendoorn, & van der Veer, 2008). Problems associated with temperamental difficulties may get more serious if not addressed which can lead to skill deficits in children.

Skill Deficit. Some children's noncompliance is the result of a skill deficit (the child may be uncertain of how to act in a classroom environment) (Alberto & Troutman, 2009). Children may not know how to interact with the materials in the classroom, which could lead them to display inappropriate play behaviors such as throwing materials (Kaiser & Rasminsky, 1999). Compliance is important because the teacher can direct the child both academically and socially to display appropriate play behaviors such as putting pieces of a puzzle together or asking for assistance during difficult tasks. The teacher can assist the child directly by showing him how to use the classroom materials appropriately and indirectly by calling attention to children that are displaying appropriate play behavior (Kaiser & Rasminsky, 1999). Teachers need to be trained to work with children who are not compliant so they can teach children appropriate behaviors and have more time to assist multiple children in the classroom. Minor noncompliance that is not addressed may lead to escalating behavior, which can lead to the child becoming uncontrollable (Gunter, Denny, Jack, Shores, & Nelson, 1993; Tarbox et al., 2007; Wilder & Atwell, 2006). This is referred to in the literature as *severe noncompliance*.

Severe Noncompliance. Severe noncompliance occurs when a child's minor noncompliance is not addressed and leads to the child's behavior becoming uncontrollable and dangerous (Ducharme & DiAdamo, 2005; McComas et al., 2000). Severe noncompliance is discussed throughout the current literature in relation to different disabilities, including autism, attention deficit hyperactivity disorder, developmental delays, and Down syndrome. Severe noncompliance is a form of noncompliance where the child becomes so out of control that they are likely to injure themselves or others during the noncompliance (Ducharme & DiAdamo, 2005; McComas et al., 2000).

Two studies examined interventions targeting children with severe noncompliance. The first was a case study conducted by McComas and colleagues (2000) with three children who exhibited severe noncompliance behaviors such as head banging, screaming, and crying. The second study by Ducharme and DiAdamo (2005) studies two children who disrupted the entire classroom by engaging in screaming and kicking. The behaviors described in both studies occurred across both home and school. The behaviors associated with severe noncompliance are dangerous to the child and people in the child's surroundings, necessitating effective and efficient interventions.

There are a variety of causes for noncompliance, including temperament and skill deficits. Minor noncompliance can escalate if not addressed and a child can become uncontrollable and exhibit severe noncompliance. Teachers should be trained in effective and efficient strategies to address noncompliance before it becomes severe.

Factors Associated with Compliance

In the literature, the role of the teacher or adult has been established as a mediating factor in eliciting child compliance (Austin & Agar, 2005; Horner & Keilitz, 1975; Stephenson & Hanley, 2010; Tarbox et al., 2007; Wolery & Gast, 1984; Wilder & Atwell, 2006). That is, adults can alter their behavior in order to produce a different outcome in the child's behavior. One such intervention is teacher prompting (Austin & Agar, 2005; Ingvarsson, Hanley, & Welter, 2009; Wilder & Atwell, 2006). There are three types of teacher prompting techniques commonly discussed throughout the literature that include least-to-most assistive prompting, high-probability command sequences, and positive reinforcement. One form of prompting, least-to-most assistive prompting involves teachers giving children increased assistance in order for children to complete teacher directives (Horner & Keilitz, 1975; Tarbox et al., 2007; Wolery &

Gast, 1984; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006). Another form of prompting, high probability command sequences allows adults to give children commands that they are likely to comply with followed by a command that they are less likely to comply with and reinforce children's compliance (Austin & Agar, 2005; Belfiore, Basile, & Lee, 2008; Mace et al., 1988). Another strategy is positive reinforcement. Positive reinforcement can increase children's compliance by reinforcing appropriate or compliant behaviors as it occurs naturally during the day (Ingvarsson, Hanley, & Welter, 2009; Mandal, Olmi, Edwards, Tingstrom, & Benoit, 2000; Wilder, Harris, Reagan, & Rasey, 2007). Prompting strategies, high probability command sequences, and positive reinforcement have been discussed throughout the literature as possible interventions to promote compliance.

Least-to-most prompting is a sequence of events where the teacher increases assistance for a child exhibiting noncompliance until the child successfully completes the teacher's directive. It involves issuing prompts in a sequence from least invasive to most invasive (Horner & Keilitz, 1975; Wolery & Gast, 1984). The first and least-invasive prompt is a verbal prompt where the teacher issues a verbal prompt to the child. For example, "Pick up the puzzle". The second prompt is a model prompt where the teacher models the behavior that she expects the child to exhibit while repeating the verbal prompt. The model prompt is not always used because in some cases the teacher may not be able to model the appropriate behavior. For example, "Get out of the bathroom". The third and most-invasive prompt is the physical prompt where the teacher physically directs the child's body to complete the directive while repeating the verbal prompt. The teacher should wait approximately 5 seconds to allow the child time to initiate completion of the directive. Once the child initiates the appropriate behavior then the prompt sequence stops (Wolery & Gast, 1984). After completion of the directive, the teacher

praises the child with encouraging words or phrases (Alberto & Troutman, 2009; Tarbox et al., 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006). For example, "You did a great job picking up the puzzle". Least-to-most prompting is simple for teachers to use because they can follow the sequence of prompts to assist children exhibiting noncompliance (Tarbox et al., 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006; Wolery & Gast, 1984). It can also be used in a variety of settings, such as during center time, outside, and at lunch, and is easy for teachers to incorporate into their daily routines such as circle time (Tarbox et al., 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006; Wolery & Gast, 1984).

High probability command sequences (HPCS) involve issuing children multiple commands (3-5) with which the child is to comply (high probability commands, or high-p) followed by a command that is less likely to be complied with (low probability commands, or low-p). The child is given approximately 5 seconds to initiate a response to the command (Austin & Agar, 2005; Belfiore, Basile, & Lee, 2008; Mace et al., 1988). The belief is that children will have a high rate of responding to the high-p commands, or "behavioral momentum" and continue that responding trend with the low-p commands (Mace et al., 1988). Compliance to any command in the sequence is verbally praised (Austin & Agar, 2005; Belfiore, Basile, & Lee, 2008). HPCS can be time consuming for teachers because the teacher must compile a list of commands where the child is likely to exhibit compliance and a list where the child is likely to exhibit noncompliance. HPCS can also be used in a variety of settings and can be integrated into the classroom routine (Austin & Agar, 2005; Belfiore, Basile, & Lee, 2008).

Positive reinforcement is a behavior principle that involves presenting a reinforcer immediately after compliant behavior that increases the likelihood of future compliance (Alberto & Troutman, 2009). Common reinforcers include access to preferred toys or activities, edibles,

and verbal praise. Teachers need to find a reinforcer that the target child is likely to respond to and that increases the likelihood of future compliance (Ingvarsson, Hanley, & Welter, 2009; Mandal, Olmi, Edwards, Tingstrom, & Benoit, 2000; Wilder, Harris, Reagan, & Rasey, 2007). Positive reinforcement can be somewhat time consuming for a teacher because the teacher must watch the target child regularly in order to immediately reinforce compliant behavior (Ingvarsson, Hanley, & Welter, 2009; Mandal et al., 2000). Positive reinforcement can be incorporated into daily routines, depending on the reinforcement. Verbal praise is probably the easiest for teachers to discretely incorporate into their classrooms, whereas access to preferred toys or activities and edibles might be more difficult to incorporate into the daily routine.

Summary. Prompting strategies, command sequences, and positive reinforcement have been demonstrated in the literature to have a positive effect on child compliance. Least-to-most prompting strategies are easier for teachers to use during their daily routines because they can follow a specific sequence. High probability command sequences are more time consuming and require the teacher to determine high-p and low-p commands for the child or children exhibiting noncompliance. Positive reinforcement is also time consuming because it requires the teacher to watch the target child in order to notice compliant behavior and immediately reinforce the behavior. Least-to-most prompting is a straightforward intervention for teachers to implement because it does not require much training time (Wolery & Gast, 1984), can be used with a variety of children (Tarbox et al., 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006), and can be used within the naturally occurring routines within the preschool classroom (Tarbox et al., 2007; Wilder & Atwell, 2006).

Single Subject Research Design

Single-subject research is the study of individual's behavior over time (Kazdin, 1982). Single-subject research is commonly used to collect data on the effectiveness of interventions. There are usually a small number of participants and behavior is assessed throughout the study. The effects of the intervention are replicated with the same participant to determine that the intervention is controlling the behavior. In single subject research, experimental control is shown by implementing an intervention across people, settings, or behaviors at different periods of time and producing the same outcome (Cooper, Heron, & Heward, 2007; Wolery & Dunlap, 2001). Single-subject research uses experimental control rather than statistical control. Experimental control is established through precise behavioral descriptions, high levels of observer agreement, repeated measures over time, and the control of possible environmental confounds through consistent experimental conditions (Cooper, Heron, & Heward, 2007). There are benefits and limitations that are associated with single-subject research.

Benefits. Single-subject research is beneficial because it focuses on specific behaviors and interventions or treatments for those behaviors. Behaviors are chosen based on their social importance, rather than theoretical importance (Baer, Wolf, & Risley, 1968). Experimental control is demonstrated by repeating an intervention and observing its effects on a behavior each time the intervention is repeated, which shows that the intervention controls the behavior (Alberto & Troutman, 2009; Baer, Wolf, & Risley, 1968; Wolery & Dunlap, 2001). The subject serves as its own control because the subject's behavior is observed under different conditions (Alberto & Troutman, 2009; Wolery & Dunlap, 2001).

Limitations. There are some limitations with a single-subject research design. Some threats that can occur to internal validity in improperly designed studies include maturation,

history, and observer drift (Alberto & Troutman, 2009; Singleton & Straits, 2009). The threats to internal validity may co-vary with the intervention, making the intervention appear successful. During long periods of intervention, the child may mature and exhibit less noncompliance as the research is conducted and therefore show that the intervention is successful. An event outside of the research setting may have an influence on the child's behavior, such as the child beginning a new therapy, the child beginning or ending a medication, or a life event such as a birth, death, or divorce (history) (Singleton & Straits, 2009). Also, the observer may change the scoring criteria rather than the subject actually changing behaviors (observer drift) (Alberto & Troutman, 2009). A multiple baseline design can control for history and maturation through repeated measurements and repeated demonstration of the effect of the intervention across people, places, or behaviors. To address the observer drift limitation, the researcher must be clear and consistent in the operationalization of compliance and noncompliance. Fidelity checks will also be conducted throughout the data collection. Fidelity checks insure that the intervention is being implemented in the way it was intended to be implemented (Singleton & Straits, 2009).

There are also threats to external validity when using a single-subject research design. Research attempts to show a relationship between the independent variable (least-to-most prompting) and dependent variable (child completion of directives), then to generalize the results to the target population (children exhibiting noncomplaince) (Singleton & Straits, 2009). Single-subject research demonstrates generalizability through exact and systematic replication (Sidman, 1960). By reproducing the effect of the intervention across subjects, even within the same experiment, the demonstration of a functional relationship is established. As the same experimenter repeats the process with different subjects (direct replication), a small level of

external validity is established. As other experimenters apply the interventions in different contexts and with different subjects, the external validity of the findings is enhanced.

Summary

Child compliance with adult directives leads to children developing new social and academic skills (Austin & Agar, 2005; Odom & Wolery, 2003). Some children may exhibit more challenging behaviors, such as noncompliance, so it is important to train teachers to address noncompliance (Austin & Agar, 2005; Ducharme & DiAdamo, 2005; Ndoro et al., 2006; Tarbox et al., 2007; Wolery & Gast, 1984). The research literature suggests that least-to-most prompting and praise increase child compliance to adult directives (Stephenson & Hanley, 2010; Tarbox et al., 2007; Wolery & Gast, 1984; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006). The focus of this study is teacher's implementation of least-to-most assistive prompt hierarchy with fidelity within the context of the preschool classroom and whether or not least-to-most prompting increases child compliance in a preschool-aged child.

CHAPTER 3: METHOD

Subjects and Setting

The target child in the present study was a 4-year-old Caucasian male who attended a private childcare center. Assessment results, based on the Ages & Stages Questionnaire, indicate that the child is functioning within normal limits for his age (Bricker, Squires, Mounts, Potter, Nickel, Twombly, & Farrell, 1999).

The classroom is a mixed-aged group that includes 14 children between 36 and 60 months (8 males and 6 females). The childcare center is located in a southern metropolitan area. The center draws from a predominantly middle-class population and 3% of its children receive childcare assistance. The classroom is organized into eight learning centers: writing, dramatic play, sand table, reading, puzzles, science, blocks, and table toys.

The 3 teachers who work with children in this classroom served as interventionists in the study. The lead teacher works with the children for the majority of the school day. She is Caucasian, has a high school diploma, and 13 years of experience in childcare. The floater assists in different classrooms at the center, but spends 2 hours per day in the target classroom during the free play period in the morning. The floater is Caucasian, and has a Master of Science degree in Human Ecology with no previous experience in childcare. The afternoon teacher overlaps with the lead teacher for a period of one hour, then she has supervisory responsibility for the group. She is Caucasian, and is a college student majoring in history with 2 years of experience in childcare.

The center uses the Pinnacle Curriculum (ChildCare Education Institute, 2007) to address developmental skills. The curriculum uses a theme-based approach, rotating activities and materials on a weekly basis. The preschool program is a full-day program consisting of free-

choice center time during arrival, then morning snack, circle time, outdoor time, lunch, and nap. In the afternoon, the children have free-choice center time as they wake up from nap, then afternoon snack, and table toys during departure.

Behavior Definitions

Compliance is not a behavior, rather a set collective term that represents a variety of observable behaviors that are contextually defined. Child *compliance* is defined as completing or initiating a task within five seconds of the teacher's directive (Austin & Agar, 2005; Tarbox et al., 2007; Wilder & Atwell, 2006; Wilder, Harris et al., 2007). *Noncompliance* is defined as a behavior that a child exhibits when she does not follow adult directives across multiple settings within five seconds of the teacher's directive. A *teacher prompt* or directive is defined as a verbal command directed at the target child and can either be verbal, modeled, and/or physical. A *verbal prompt* is defined as any direction given by the teacher to the child in the absence of any other prompting. A *model prompt* is defined as the teacher demonstrating to the child what is expected after the initial verbal prompt. A *physical prompt* is defined as the teacher guiding the child's body to show what behavior is expected after the verbal prompt (Alberto & Troutman, 2009). During model and physical prompts the teacher should repeat the verbal prompt. The teacher should praise the child after the child completes the teacher's directive. *Praise* is defined as encouraging words or phrases that recognize the child's completion of a directive (Alberto & Troutman, 2009).

Observation Procedure

Event recording was used to collect data. Event recording is a data collection technique where the observer records the number of times and event occurs within a set time frame (Alberto & Troutman, 2009; Cooper, Heron, & Heward, 2007). For the purposes of the current

study, an event begins when the teacher issues a directive to the target child and ends when the child: 1) completes the behavior or 2) does not initiate the completion of the behavior within 5 seconds (Wilder & Atwell, 2006) and the teacher does not initiate a higher level of prompting.

Baseline. The study was conducted in the preschool classroom the child attends regularly with familiar adults. Data were collected during the child's free play while the children were in learning centers. Each session consisted of a 15-minute observation. During baseline, teachers were given no specific instructions on their interaction with the target child, other than "do what they normally do".

Least-to-most Prompting Intervention. Data were collected during the child's free play period while children were in learning centers. Teachers were trained through written instructions and role play with the primary researcher. The least-to-most intervention included 6 steps which are (a) issue verbal prompt; (b) wait 5 seconds for a response; (c) if not completed, issue verbal prompt again and model expected behavior; (d) wait 5 seconds for a response; (e) if not completed, issue verbal prompt again along with physical assistance to complete task; (f) praise completion of task (based on Horner & Keilitz, 1975; Wilder & Atwell, 2006). For the prompt sequence to be considered correct, teachers needed to issue a more intrusive prompt following a less intrusive prompt. For example, it was considered correct if the teacher moved from a verbal to a physical prompt. However, beginning with a more intrusive prompt (e.g., physical) failing to provide wait time between prompts or omitting praise was counted as an incorrect prompt. Treatment fidelity can be higher when the independent variable is simple and standardized and can be maintained by providing training and practice for the teachers implementing the intervention (Cooper, Heron, & Heward, 2007). The primary researcher provided coaching to each teacher for approximately the first 5 sessions of the intervention

(Teacher One = 7 sessions, Teacher Two = 6 sessions, Teacher Three = 2 sessions). Percentage of child compliance was calculated by dividing the number of completed directives by the total number of directives given by the teacher and multiplied by 100. Teacher One implemented the intervention correctly 6% during baseline (range, 0%-14%). During intervention she implemented the intervention correctly an average of 80% (range, 67%-86%). Teacher Two implemented the intervention correctly 2% during baseline (range, 0%-17%). During intervention she implemented the intervention correctly an average of 82% (range, 75%-100%). Teacher Three implemented the intervention correctly 3% during baseline (range, 0%-33%). During intervention she implemented the intervention correctly an average of 80% (range, 71%-83%).

Maintenance. A follow-up probe was done two weeks after the last data were collected during the least-to-most prompting intervention. This probe was conducted to determine if the teacher's maintained the fidelity of the least-to-most prompting intervention and also to measure the child's compliance in response to teacher directives. No coaching was provided to the teachers. Teacher One and Teacher Two implemented the least-to-most prompting intervention with 100% fidelity and Teacher 3 implemented it with 89% fidelity.

Experimental Design

A single-subject research design was used to record teacher prompting and child compliance in response to teacher directives. The child's behavior was measured as the intervention with the three adults is implemented with the child (Lane et al., 2007). A multiple baseline design was used to measure child compliance during the least-to-most prompting intervention across three teachers.

Interobserver Agreement

Interobserver reliability checks were conducted throughout the study. Interobserver agreement refers to an assessment of reliability that examines observers using the same measures and how similar their results are to one another (Singleton & Straits, 2009). Reliability checks were conducted on 20% of the observation sessions with an agreement of 80% or higher (Cooper, Heron, & Heward, 2007; Wolery & Dunlap, 2001).

The reliability observer was given the data-recording sheet and the primary data collector explained each step of the least-to-most intervention process and how to score the teacher as correct or incorrectly following the intervention and the child as completing or not completing the directive. Then the primary data collector trained the reliability observer in a classroom by talking the observer through the scoring process and they observed a child. Finally, the primary data collector and reliability observer collected data in separate areas of the room on the same child and teacher. Once reliability was at 80% the data was scored as reliable.

CHAPTER 4: RESULTS

This study sought to determine if teachers could implement a least-to-most assistive prompt hierarchy with fidelity within the context of the preschool classroom and to examine the effect of a least-to-most prompting intervention on child compliance to teacher directives. Results indicate that teachers were able to implement the least-to-most assistive prompt hierarchy with high fidelity within the preschool classroom.

As indicated in Figure 1, baseline levels of child compliance to teacher directives initially varied by the teacher, averaging 36%. Baseline levels of teacher fidelity were low for all teachers, averaging 3%. After the least-to-most prompting intervention was implemented, the percentage of compliance to teacher directives increased across all teachers, averaging 81%. Teacher fidelity also increased after the least-to-most prompting intervention was implemented, averaging 81% Additionally, gains in child compliance and teacher fidelity were maintained two weeks after the initial intervention period (average of 96% for child compliance to teacher directives and 96% for teacher fidelity).

Fidelity of Least-to-Most Intervention

For Teacher One, it appeared that the low percentage of child compliance to teacher directives was due to the teacher's repeated use of verbal prompts, lack of wait time, failure to use increased levels of prompting, and failure to get the child to complete directives. During baseline, Teacher One used verbal prompts 97% of the time, was not observed to model behavior for the child, and only physically directed the target child to complete a directive 3% of the time. The teacher rarely followed through after a directive was issued and the target child was frequently allowed to escape the task. When the child completed the directive, Teacher One only used praise 6% of the observed events. After training Teacher One to use the least-to-most

prompting intervention, levels of verbal, modeling, and physically directing the target child to complete a directive increased to 100%, 25%, and 27% respectively. The amount of praise also increased to 77%.

For Teacher Two, it appeared that the low percentage of child compliance to teacher directives was due to the teacher's repeated use of verbal prompts, failure to use increased levels of prompting, and failure to get the child to complete directives. During baseline, Teacher Two had low levels of modeling (0%), physical guidance (9%), and praise (2%). The majority of her promptss were verbal (98%). After training Teacher Two to use the least-to-most prompting intervention, levels of modeling, physical guidance, and praise all increased to 30%, 23%, and 84% respectively.

For Teacher Three, it appeared that the low percentage of child compliance to teacher directives was due to the teacher's repeated use of verbal prompts, failure to use increased levels of prompting, and failure to get the child to complete directives. During baseline, Teacher Three had low levels of physical guidance (2%) and praise (3%). Once the intervention was implemented with Teacher Three, the percentages of physical guidance and praise increased to 24% and 80% respectively.

Effect of Least-to-Most Prompting Interventions on Child Compliance

During baseline for Teacher One, the target child's compliance to teacher directives averaged 39% (range, 25%-44%). Once the teacher was trained to use the least-to-most prompting intervention, the target child's compliance to teacher directives averaged 80% (range, 67%-86%). The target child's compliance to teacher directives increased 41 percentage points from baseline to intervention.

During baseline for Teacher Two, the target child's compliance to teacher directives averaged 38% (range, 38%-43%). Once the teacher was trained to use the least-to-most prompting intervention, the target child's compliance to teacher directives averaged 82% (range, 75%-100%). The target child's compliance to teacher directives increased 44 percentage points from baseline to intervention.

During baseline for Teacher Three, the target child's compliance to teacher directives averaged 37% (range, 25%-43%). Once the teacher was trained to use the least-to-most prompting intervention, the target child's compliance to teacher directives averaged 80% (range, 71%-83%). The target child's compliance to teacher directives increased 43 percentage points from baseline to intervention.

During maintenance for Teacher One child compliance to teacher directives averaged 100%. During maintenance for Teacher Two child compliance to teacher directives averaged 100%. During maintenance for Teacher Three child compliance to teacher directives averaged 89%.

During baseline, all three teachers had low levels of compliance and rarely used higher level prompts to gain child compliance. Once the teachers were trained to use the least-to-most prompting intervention they were able to use it in the correct order to gain child compliance. The levels of child compliance also increased once the least-to-most prompting intervention was initiated. Least-to-most prompting is an errorless learning procedure meaning that if teachers implement the intervention with 100% fidelity then compliance would also be 100%.

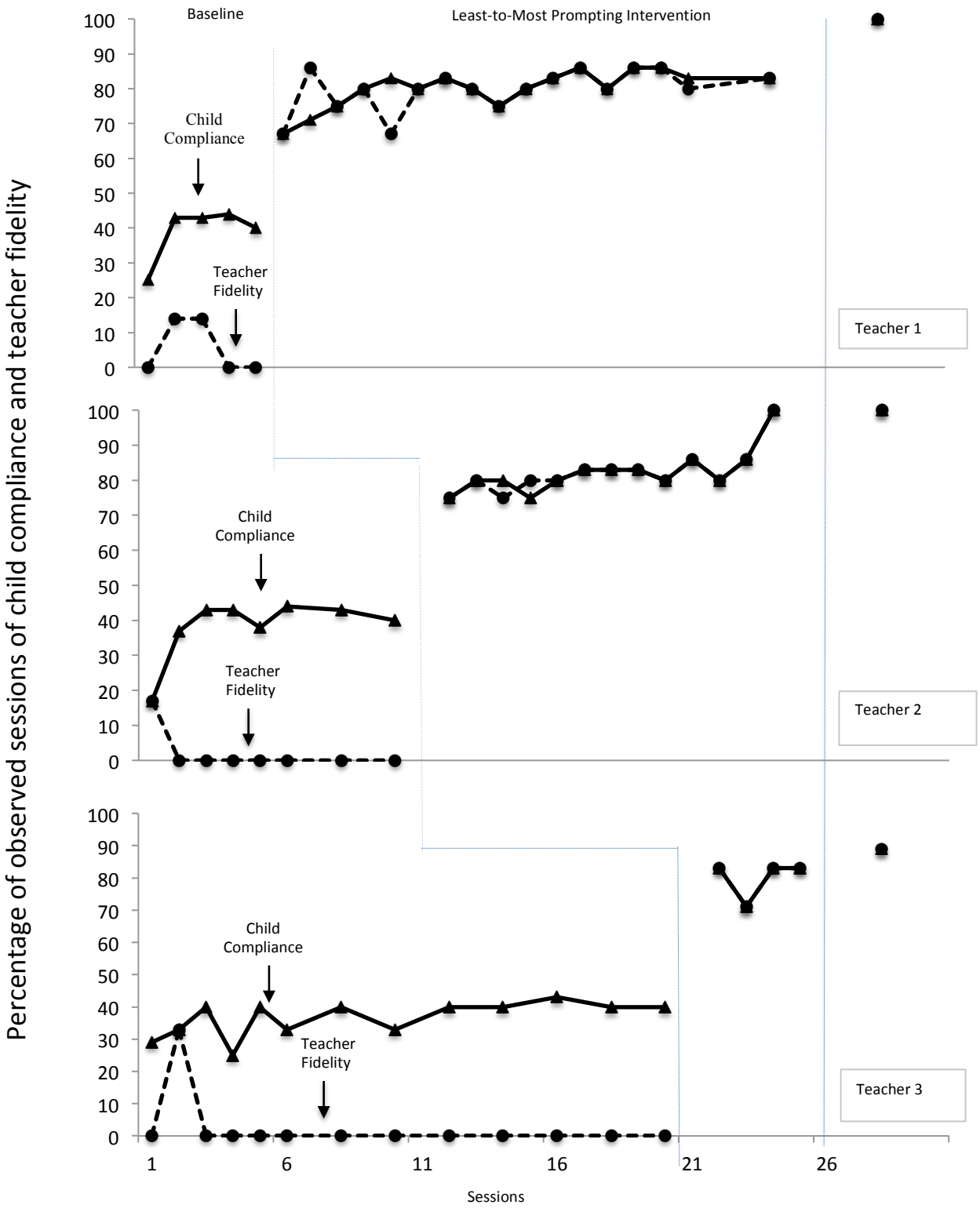

Figure 1. Percent of sessions observed with child compliance to teacher directives and teacher fidelity across baseline and intervention

CHAPTER 5: DISCUSSION

The least-to-most prompting intervention increased child compliance to teacher directives in this study. These results add to previous research by using the least-to-most prompting intervention with a child who is typically developing, as opposed to a child with a disability, which most previous research has studied (Tarbox, Wallace, Penrod, & Tarbox, 2007; Wilder & Atwell, 2006; Wilder, Atwell, & Wine, 2006). The current study's results indicate that the intervention can increase compliance in children that are typically developing. The least-to-most intervention appeared to fit well within a child-directed framework in the naturally occurring routines of the early childhood classroom. Because teacher fidelity of the treatment intervention was high, it appears that teachers were comfortable implementing the intervention. It is interesting to note that while teachers were not observed using systematic prompting during the baseline condition, they did incorporate different types of prompting into their behavior management within the classroom.

Teacher familiarity with prompts may have impacted how quickly they learned the least-to-most prompting procedure. Teachers with more teaching experience may learn the least-to-most prompting procedure quicker than teachers with less teaching experience because the procedures are already familiar. Because the skills were already in their repertoire, they merely had to learn to systematically order the steps in the intervention (Dusenbury, Brannigan, Hansen, Walsh, & Falco, 2005; Yeon, Stormont, & Espinosa, 2009). Teachers with less experience may not have the knowledge about modeling, physically directing, or praising children. In the current study, Teacher Two had the most experience and correctly implemented the intervention 83% of the time. Teacher One had the least experience and correctly implemented the intervention 77% of the time. These results are consistent with previous research, which concludes that experience

influences teacher implementation of interventions (Dusenbury et al., 2005; Yeon, Stormont, & Espinosa, 2009).

It is important to note that teachers in this study had varying levels of education and prior experience in child care; therefore, this intervention could be viewed as applicable to a wide variety of child care teachers. The education level of the teachers in the current study range from high school diploma to a Master of Science and the experience ranges from no previous experience in child care to 13 years of experience in child care. Previous research indicates that level of education corresponds with sensitivity and appropriateness of interactions with children (Maxwell, McWilliam, Hemmeter, Ault, & Schuster, 2001). Additional research indicates that training caregivers about appropriate teacher-child interactions influences their practices with children (Fukkink & Lont, 2007). The current study found that the teacher with the lowest level of education, but the most experience in child care was the best at correctly implementing the intervention (83%), while the teacher with the highest level of education, but the least amount of experience in child care was the worst at correctly implementing the intervention (77%). These results may due to the fact that Teacher Two has more experience and training hours than Teacher One, which would be consistent with Fukkink and Lont's (2007) study, but contradict Maxwell and colleagues' (2001) study. These results indicate that teachers with varying level of experience and education benefitted from the training procedures.

An increase in child compliance to teacher directives is consistent with all three teachers' correct use of the least-to-most prompting intervention. This is consistent with previous research, which recommends training teachers to use least-to-most prompting intervention increase child compliance (Tarbox et al., 2007; Wilder & Atwell, 2007). Least-to-most prompting has been used with children diagnosed with autism, children with developmental

delays, and adults with head trauma and corresponds to improved behavior with all of these populations (Ndoro et al., 2006; Tarbox et al., 2007; Wesolowski, Zencius, McCarthy-Lydon, & Lydon, 2005).

Clinical Implications

A child's noncompliant behavior affects the people that interact with the child (Van Acker & Grant, 1996). It is important to intervene to improve the child's compliant behavior because an intervention can have positive effects for the targets child as well as the people around the child. Improving child compliant behavior has clinical implications for the target child, peers in the classroom, and the teacher.

Improving the target child's complaint behavior by using least-to-most prompting has positive effects on the child's academic skills, peer relationships, and disposition for school. The target child is able to focus on skills being taught by the teacher. Children that are compliant are more likely to have positive peer relationships and form friendships than children that are noncompliant (Buhs & Ladd, 2001; Rubin et al, 2005). Compliant children may have more positive dispositions toward school and are more likely to remain in school; whereas, children that are consistently noncompliant are more likely to drop out of school (Odom & Wolery, 2003). Intervening with a child exhibiting noncompliance has positive effects on the target child's outcomes and may also influence the peers in the classroom.

The peers in a classroom also benefit from a child's improved compliant behavior. When the children in a classroom are compliant, the teacher is able to rotate her attention to many children and therefore form positive relationships with the children (Odom & Wolery, 2003). The children will also experience a stress-free and safe environment because they feel that the

teacher is caring for their safety and well-being (Hendley, 2007; Perry, 2000). Improving a child's behavior positively influences the peers that interact with the target child.

The teacher will experience benefits from improving a child's compliant behavior. Improving a child's behavior will help the teacher to focus on children's academic and social skills rather than addressing problem behavior (Odom & Wolery, 2003). The teacher will also be less likely to experience stress and future burnout and therefore be less likely to leave the teaching profession (Baumgartner, Carson, Apavaloaie, & Tsouloupas, 2009). Improving a child's compliant behavior allows the teacher to focus on teaching and may prevent her from burnout due to stress.

Improving a child's compliant behavior has many immediate and long-term benefits for the target child, the classroom peers, and the teacher. The target child will be more likely to learn from the teacher and have a better chance of completing school. The classroom peers are able to form a positive relationship with their teacher and feel safe in a classroom environment. The teacher can focus on improving children's academic and social skills and will be less likely to experience stress and burnout. It is important to increase a child's compliance because there are positive effects for the people that interact with the child.

Future Research

Additional research is needed to determine other aspects that may affect the least-to-most prompting intervention for both teachers and the target child. Future research could improve intervention training, implementation, and generalization. Future research in this area could extend the intervention period, incorporate video clips of teachers, and examine whether or not generalization of least-to-most intervention procedures occurs.

Future research should extend the intervention period so that all three teachers have at least 3 weeks or 21 days during the intervention period. Previous research in psychology indicates that a behavior must be practiced for 21 days in order for it to become a habit (Tobias, 2009). This research could be generalized to intervention research, which may show that if teachers practice intervention procedures for 21 days then the intervention will become a habit for the teacher.

Video clips of teachers can be used both to train teachers and for self-monitoring during the intervention. Video clips have been used in previous research to teach children with autism appropriate behaviors, teach people to self-monitor, and to encourage teachers to evaluate their teaching practices (Buggey, 2005; Malmstrom, Kennedy, & Korn, 2004; Pelletier, McNamara, Braga-Kenyon, & Ahearn, 2010). Teachers can be videotaped during baseline conditions then when they are trained to use the least-to-most prompting intervention, the trainer can show them occasions where the intervention procedures could have been used. Video clips could also be used during the intervention in order for teacher to monitor themselves and become more aware of when and how to use the intervention procedures.

Future research could examine the generalization of the intervention procedures. The teachers in the current study were trained to use the least-to-most prompting intervention with one child. It would be interesting to study whether or not the teachers are able to generalize the intervention to other children in the classroom. The teachers in the current study were also told not to inform other teachers about the intervention. Future studies could examine whether teachers share the intervention with other teachers in the absence of being told not to discuss the intervention.

REFERENCES

Alberto, P.A., & Troutman, A.C. (2009). *Applied behavior analysis for teachers (8th ed.)*. Upper Saddle River, NJ: Pearson Education, Inc.

Austin, J., & Agar, G. (2005). Helping young children follow their teachers' directions: The utility of high probability command sequences in pre-k and kindergarten classrooms. *Education and Treatment of Children*, *28*(3), 222-236.

Baer, D.M., Wolf, M.M., & Risley, T.R. (1968) Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1*(1), 91-97.

Baumgartner, J. J., Carson, R. L., Apavaloaie, L., & Tsouloupas, C. (2009). Uncovering common stressful factors and coping strategies among childcare providers. *Child & Youth Care Forum*, 38(5), 239-251.

Belfiore, P. J., Basile, S., & Lee, D. L. (2008). Using a high probability command sequence to increase classroom compliance: The role of behavioral momentum. *Journal of Behavioral Education*, 17(2), 160-171. doi:10.1007/s10864-007-9054-x.

Bradley, R., & Corwyn, R. (2008). Infant temperament, parenting, and externalizing behavior in first grade: A test of the differential susceptibility hypothesis. *Journal of Child Psychology and Psychiatry*, *49*(2), 124-131.

Bricker, D., Squires, J., Mounts, L., Potter, L., Nickel, R., Twombly, E., & Farrell, J. (1999). Ages & Stages Questionnaires: A Parent-Completed, Child-Monitoring System (2nd ed.). Baltimore, MD: Brookes Publishing Co.

Buggey, T. (2005). Video self-modeling applications with students with autism spectrum disorder in a small private school setting. *Focus on Autism and Other Developmental Disabilities*, 20(1), 52-63. doi:10.1177/10883576050200010501.

Burney, R., & Leerkes, E. (2010). Links between mothers' and fathers' perceptions of infant temperament and coparenting. *Infant Behavior & Development*, *33*(2), 125-135. doi:10.1016/j.infbeh.2009.12.002.

Buhs, E., & Ladd, G. (2001). Peer rejection as an antecedent of young children's school adjustment: An examination of mediating processes. *Developmental Psychology, 37*(4), 550-560.

Cooper, J.O., Heron, T.E., & Heward, W.L. (2007). *Applied behavior analysis (2nd ed.)*. Upper Saddle River, NJ; Merrill.

Copple, C. & Bredekamp, S. (2009). *Developmentally appropriate practice in early childhood programs serving children from birth through age 8 (3rd ed.).* Washington, D.C.: National Association for the Education of Young Children.

Cote, C. A., Thompson, R. H., & McKerchar, P. M. (2005). The effects of antecedent interventions and extinction on toddlers' compliance during transitions. *Journal of Applied Behavior Analysis, 38*(2)*,* 235-238.

Crockenberg, S., & Leerkes, E. (2005). Infant temperament moderates associations between childcare type and quantity and externalizing and internalizing behaviors at years. *Infant Behavior & Development*, *28*(1), 20-35. doi:10.1016/j.infbeh.2004.07.002.

Crowther, J. H., Bond, L. A., & Rolf, J. E. (1981). The incidence, prevalence, and severity of behavior disorders among preschool-aged children in day care. *Journal of Abnormal Child Psychology, 9*(1)*,* 23-42.

Ducharme, J., & DiAdamo, C. (2005). An errorless approach to management of child noncompliance in a special education setting. Research Brief. *School Psychology Review*, *34*(1), 107-115.

Dusenbury, L., Brannigan, R., Hansen, W. B., Walsh, J., & Falco, M. (2005). Quality of implementation: Developing measures crucial to understanding the diffusion of preventive interventions. *Health Education Research*, 20(3), 308-313. doi:10.1093/her/cyg134.

Fukkink, R. G., & Lont, A. (2007). Does training matter? A meta-analysis and review of caregiver training studies. *Early Childhood Research Quarterly*, 22(3), 294-311.

Gilissen, R., Bakermans-Kranenburg, M., van IJzendoorn, M., & van der Veer, R. (2008). Parent–child relationship, temperament, and physiological reactions to fear-inducing film clips: Further evidence for differential susceptibility. *Journal of Experimental Child Psychology*, *99*(3), 182-195. doi:10.1016/j.jecp.2007.06.004.

Godby, S., Gast, D., & Wolery, M. (1987). A comparison of time delay and system of least prompts in teaching object identification. *Research in Developmental Disabilities*, *8*(2), 283-305. doi:10.1016/0891-4222(87)90009-6.

Gunter, P. L., Denny, R. K., Jack, S. L., Shores, R. E., & Nelson, C. M. (1993). Aversive stimuli in academic interactions between students with serious emotional disturbance and their teachers. *Behavioral Disorders, 18*(4), 265-274.

Hane, A., Fox, N., Cindy, P., Ghera, M., & Guner, B. (2006). Contextual basis of maternal perceptions of infant temperament. *Developmental Psychology*, *42*(6), 1077-1088. doi:10.1037/0012-1649.42.6.1077.

Hendley, S. L. (2007). Use positive behavior support for inclusion in the general education classroom. *Intervention in School & Clinic*, 42(4), 225-228.

Horner, R. D., & Keilitz, I. (1975). Training mentally retarded adolescents to brush their teeth. *Journal of Applied Behavior Analysis, 8*(3), 301–309.

Ingvarsson, E. T., Hanley, G. P., & Welter, K. M. (2009). Treatment of escape-maintained behavior with positive reinforcement: The role of reinforcement contingency and density. *Education and Treatment of Children*, 32(3), 371-401.

Kaiser, B. & Rasminsky, J.S. (1999). *Meeting the challenge: Effective strategies for challenging behaviours in early childhood environments*. Ottawa, ON: Canadian Child Care Federation.

Karreman, A., de Haas, S., van Tuijl, C., van Aken, M., & Deković, M. (2010). Relations among temperament, parenting and problem behavior in young children. *Infant Behavior & Development*, *33*(1), 39-49. doi:10.1016/j.infbeh.2009.10.008.

Kazdin, A.E. (1982). *Single-case research designs: Methods for clinical and applied settings*. New York: Oxford University Press.

Lamb, M. E., Bornstein, M. H., & Teti, D. M. (2002). *Development in infancy: An introduction* (4th ed.) (p. 365-366). Mahwah, NJ: Erlbaum.

Lane, K., Wolery, M., Reichow, B., & Rogers, L. (2007). Describing baseline conditions: Suggestions for study reports. *Journal of Behavioral Education*, *16*(3), 224-234. doi:10.1007/s10864-006-9036-4.

Mace, F., Hock, M. L., Lalli, J. S., West, B. J., Belfiore, P. J., Pinter, E., & Brown, D.K. (1988). Behavioral momentum in the treatment of noncompliance. *Journal of Applied Behavior Analysis*, 21(2), 123-141. doi:10.1901/jaba.1988.21-123.

MacWhinney, B. (2005). Language development. In M. Bornstein & M. Lamb (Eds.), *Developmental Science: An advanced textbook,* 5th Edition. (pp. 359-387). Hillsdale, NJ: Erlbaum.

Malmstrom, T. K., Kennedy, E. A., & Korn, J. H. (2004). Videotaping teaching: Student and teacher viewpoints. *Teaching of Psychology*, 31(3), 185-188.

Mandal, R., Olmi, D., Edwards, R., Tingstrom, D., & Benoit, D. (2000). Effective instruction delivery and time-in: Positive procedures for achieving child compliance. *Child & Family Behavior Therapy*, *22*(4), 1-12. doi:10.1300/J019v22n04.

Maxwell, K. L., McWilliam, R. A., Hemmeter, M., Ault, M., & Schuster, J. W. (2001). Predictors of developmentally appropriate classroom practices in kindergarten through third grade. *Early Childhood Research Quarterly*, 16(4), 431-52.

McClelland, M. M., Morrison, F. J., & Holmes, D.L. (2000). Children at risk for early academic problems: The role of learning-related social skills. *Early Childhood Research Quarterly*, *15*(3), 307–329.

McComas, J., Wacker, D., Cooper, L., Peck, S., Golonka, Z., Millard, T., et al. (2000). Effects of the high-probability request procedure: Patterns of responding to low-probability

requests. *Journal of Developmental and Physical Disabilities*,*12*(2), 157-171. doi:10.1023/A:1009411706876.

McGee, G. G., & Daly, T. (2007). Incidental teaching of age-appropriate social phrases to children with autism. *Research & Practice for Persons with Severe Disabilities, 32*(2), 112-123.

Ndoro, V., Hanley, G., Tiger, J., & Heal, N. (2006). A descriptive assessment of instruction-based interactions in the preschool classroom. *Journal of Applied Behavior Analysis*, *39*(1), 79-90. doi:10.1901/jaba.2006.146-04.

Odom, S., & Wolery, M. (2003). A unified theory of practice in early intervention/early childhood special education: Evidence-based practices. *Journal of Special Education*, *37*(3), 164-173.

Olson, S. L., & Lunkenheimer, E. S. (2009). Expanding concepts of self-regulation to social relationships: Transactional processes in the development of early behavioral adjustment. In A. J. Sameroff (Ed.), *Transactional processes in development*. Washington, DC: APA.

Pelletier, K., McNamara, B., Braga-Kenyon, P., & Ahearn, W. H. (2010). Effect of video self-monitoring on procedural integrity. *Behavioral Interventions*, 25(4), 261-274. doi:10.1002/bin.316.

Perry, B. D. (2000). Creating an emotionally safe classroom. *Early Childhood Today*, 15(1), 35-37.

Rubin, K.H., Coplan, R., Chen, X., Buskirk, A. & Wojslawowicz, J.C. (2005). Peer relationships in childhood. In M. Bornstein & M. Lamb (Eds.), *Developmental Science: An advanced textbook,* 5th Edition. (pp. 469-512). Hillsdale, NJ: Erlbaum.

Saifer, S. (2003). *Practical solutions to practically every problem (revised edition)*. St. Paul, MN: Redleaf Press.

Sidman, M. (1960). *Tactics of scientific research: Evaluating experimental data in psychology*. New York: Basic Books.

Singleton Jr., R. A. & Straits, B. C. (2009). *Approaches to social research* (5th ed.). New York, NY: Oxford University Press.

Skinner, B. F. (1987). *Whatever happened to psychology as the science of behavior? American Psychologist*, 780-786.

Stephenson, K. M., & Hanley, G. P. (2010). Preschoolers' compliance with simple instructions: A descriptive and experimental evaluation. *Journal of Applied Behavior Analysis*, 43(2), 229-247.

Stright, A., Gallagher, K., & Kelley, K. (2008). Infant temperament moderates relations between maternal parenting in early childhood and children's adjustment in first grade. *Child Development*, *79*(1), 186-200. doi:10.1111/j.1467-8624.2007.01119.x.

Tarbox, R., Wallace, M., Penrod, B., & Tarbox, J. (2007). Effects of three-step prompting on compliance with caregiver requests. *Journal of Applied Behavior Analysis*, *40*(4), 703-706.

Tobias, R. (2009). Changing behavior by memory aids: A social psychological model of prospective memory and habit development tested with dynamic field data. *Psychological Review*, 116(2), 408-438. doi:10.1037/a0015512.

U.S. Department of Education (2002). *The no child left behind act of 2001* (PUBLIC LAW 107–110). Washington, DC: U.S. Government Printing Office.

Van Acker, R. & Grant, S.H. (1996). Teacher and student behavior as a function of risk for aggression. *Education and Treatment of Children. 19*(3) 316-335

Wayne, A., DiCarlo, C., Burts, D., & Benedict, J. (2007). Increasing the literacy behaviors of preschool children through environmental modification and teacher mediation. *The Journal of Research in Childhood Education, 22*(1), 5-16.

Webster-Stratton, C., Reid, M., & Hammond, M. (2004). Treating children with early-onset conduct problems: Intervention outcomes for parent, child, and teacher training. *Journal of Clinical Child and Adolescent Psychology, 33*(1)*,* 105-124.

Wesolowski, M. D., Zencius, A. H., McCarthy-Lydon, D., & Lydon, S. (2005). Using behavioral interventions to treat speech disorders in persons with head trauma. *Behavioral Interventions*, 20(1), 67-75. doi:10.1002/bin.169

Wilder, D., & Atwell, J. (2006). Evaluation of a guided compliance procedure to reduce noncompliance among preschool children. *Behavioral Interventions*, *21*(4), 265-272. doi:10.1002/bin.222.

Wilder, D., Atwell, J., & Wine, B. (2006). The effects of varying levels of treatment integrity on child compliance during treatment with a three-step prompting procedure. *Journal of Applied Behavior Analysis, 39*(3), 369-373.

Wilder, D., Harris, C., Reagan, R., & Rasey, A. (2007). Functional analysis and treatment of noncompliance by preschool children. *Journal of Applied Behavior Analysis*, *40*(1), 173-177. doi:10.1901/jaba.2007.44-06.

Wilder, D. A., Zonneveld, K., Harris, C, Marcus, A., & Reagan, R. (2007). Further analysis of antecedent interventions on preschooler's compliance. *Journal of Applied Behavior Analysis, 40*(3)*,* 535-539.

Wolery, M., & Gast, D. L. (1984). Effective and efficient procedures for the transfer of stimulus control. *Topics in Early Childhood Special Education*, *4*(3), 52-77. doi:10.1177/027112148400400305

Wolery, M., & Dunlap, G. (2001). Reporting on studies using single-subject experimental methods. *Journal of Early Intervention*, 24(2), 85-89.

Yeon Ha, K., Stormont, M., & Espinosa, L. (2009). Contributing factors to South Korean early childhood educators' strategies for addressing children's challenging behaviors. *Journal of Early Intervention*, 31(3), 227-249.

APPENDIX A: INSTITUTIONAL REVIEW BOARD APPLICATION

Application for Exemption from Institutional Oversight

Institutional Review Board
Dr. Robert Mathews, Chair
131 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.6792
irb@lsu.edu
lsu.edu/irb

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/ projects using living humans as subjects, or samples, or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.

-- Applicant,Please fill out the application in its entirety and include the completed application as well as parts A-E, listed below, when submitting to the IRB. Once the application is completed, please submit two copies of the completed application to the IRB Office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at http://www.lsu.edu/screeningmembers.shtml

-- A Complete Application Includes All of the Following:
(A) Two copies of this completed form and two copies of part B thru E.
(B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1&2)
(C) Copies of all instruments to be used.
*If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.
(D) The consent form that you will use in the study (see part 3 for more information.)
(E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB. Training link: (http://phrp.nihtraining.com/users/login.php.)
(F) IRB Security of Data Agreement: (http://www.lsu.edu/irb/IRB%20Security%20of%20Data.pdf)

1) Principal Investigator: Cynthia F. DiCarlo **Rank:** Associate Professor

Dept: Human Ecology **Ph:** 579-7005 **E-mail:** cdicar2@lsu.edu

2) Co Investigator(s): please include department, rank, phone and e-mail for each

Courtney Powers, graduate student, (504) 909-4144, cpower2@lsu.edu

IRB# E5328 LSU Proposal #_____

⊗ Complete Application

⊗ Human Subjects Training

3) Project Title: Compliance in preschool-aged children

Study Exempted By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 | www.lsu.edu/irb
Exemption Expires: 11-30-2013.

4) Proposal? (yes or no) No **If Yes, LSU Proposal Number**

Also, if YES, either ◯ **This application completely matches the scope of work in the grant**

OR ◯ **More IRB Applications will be filed later**

5) Subject pool (e.g. Psychology students) children < 18

*Circle any **"vulnerable populations" to be used:** (children <18; the mentally impaired, pregnant women, the ages, other). Projects with incarcerated persons cannot be exempted.

6) PI Signature [signature] **Date** 11-17-10 (no per signatures)

**** I certify my responses are accurate and complete.** If the project scope or design is later changes, I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Screening Committee Action: Exempted ✓ Not Exempted ____ Category/Paragraph 1

Reviewer Mathews **Signature** [signature] **Date** 12/1/10

APPENDIX B: TEACHER CONSENT FORM

1. **Study Title:**
   Compliance in Preschool-Aged Children

2. **Performance Sites:**

   Country Day School of Baton Rouge on Silverside Dr.

3. **Contacts:** M-F 8:30 a.m. – 3:00 p.m.

   Courtney Powers, Graduate Student (504)909-4836
   Dr. Cynthia Dicarlo, Associate Professor, (225) 578-7005

4. **Purpose of the Study:**
   The purpose of the present study is to determine an effective intervention for teachers to use with children to increase compliance.

5. **Subjects:**

   A. Inclusion Criteria
   Teachers working with four-year-old children who are typically developing

   B. Exclusion Criteria
   Teachers who do not work with children that are typically developing

   C. Maximum number of subjects: 3 teachers of preschool children

6. **Study Procedures:**
   Teacher behaviors will be observed during times/activities where the teacher would like to see an increase in child compliance. Observers will collect data during teacher-identified times/activities, while teachers and children engage in their naturally occurring routine.

7. **Benefits:**
   As a result of this observation, teachers will gain information and skills on child compliance.

8. **Risks/Discomforts:**
   There are no known risks for participation in this study.

9. **Measures taken to reduce risk**
   There are no known risks for participation in this study.

10. **Right to Refuse:**
    Participation in the study is voluntary and subjects may change their mind and withdraw from the study at any time without penalty.

11. **Privacy:**
    This study is confidential. Results of the study may be publicly presented for educational purposes and no identifying information will be included in the presentation. Specific information concerning a child other than their own will not be shared with parents.

12. **Financial Information:**

    No incentives will be delivered.

13. **Withdrawal:**

    Subjects may withdraw at any time.

14. Removal:

Individuals will be removed from the study at their request.

15. Signatures:

The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Chairman, LSU Institutional Review Board, (225)578-8692. I agree to participate in the study described above and acknowledge the researchers' obligation to provide me with a copy of this consent form if signed by me.

Teacher Signature_____ Date_____

Study Exempted By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 | www.lsu.edu/irb
Exemption Expires: 11-30-2013

APPENDIX C: CHILD CONSENT FORM

1. **Study Title:**
   Compliance in Preschool-Aged Children

2. **Performance Sites:**

   Country Day School of Baton Rouge on Silverside Dr.

3. **Contacts:** M-F 8:30 a.m. – 3:00 p.m.

   Courtney Powers, Graduate Student (504)909-4836
   Dr. Cynthia Dicarlo, Associate Professor, (225) 578-7005

4. **Purpose of the Study:**
   The purpose of the present study is to determine an effective intervention for teachers to use with children to increase compliance.

5. **Subjects:**
   A. Inclusion Criteria
   Four year old children who are functioning within normal limits for their age.

   B. Exclusion Criteria
   Children with identified developmental delays

   C. Maximum number of subjects: 5 four-year-old children

6. **Study Procedures:**
   Preschool-aged children will be observed during times/activities where the teacher would like to see an increase in child compliance. Observers will collect data during teacher-identified times/activities, while teachers and children engage in their naturally occurring routine.

7. **Benefits:**
   As a result of this study, teachers will gain information and skills which should increase child compliance.

8. **Risks/Discomforts:**
   There are no known risks for participation in this study.

9. **Measures taken to reduce risk**
   There are no known risks for participation in this study.

10. **Right to Refuse:**
    Participation in the study is voluntary and subjects may change their mind and withdraw from the study at any time without penalty.

11. **Privacy:**
    This study is confidential. Results of the study may be publicly presented for educational purposes and no identifying information will be included in the presentation. Specific information concerning a child other than their own will not be shared with parents.

12. **Financial Information:**

    No incentives will be delivered.

13. **Withdrawal:**

    Subjects may withdraw at any time.

14. Removal:

Individuals will be removed from the study at their request.

15. Signatures:

The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Chairman, LSU Institutional Review Board, (225)578-8692. I agree to participate in the study described above and acknowledge the researchers' obligation to provide me with a copy of this consent form if signed by me.'

My child, _____, has permission to participate in the "Compliance in Preschool-aged Children" study.

Parent Signature_____ Date_____

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2. **Child Assent**

A researcher will read the following statement:

"Someone will watch you playing in the classroom. Is it okay if we watch you play?"

Subject Signature_____ Date_____

Students may write their name, mark an X, or give verbal assent.

Student gives verbal assent_____

Student does not give verbal assent_____

Study Exempted By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
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Exemption Expires: 11-30-2013

APPENDIX D: DATA SHEET

Child Compliance & Teacher Behavior

Date:_____ Observer:_____ Teacher: _____

Event recording: An event begins when the teacher issues a prompt to the target child & ends when the child: 1) completes the behavior or 2) does not initiate the completion of the behavior within 5 seconds and the teacher does not initiate a higher level of prompting.

Behavior definitions:
Teacher prompting - correct prompting using LtM (verbal, wait, model, wait, physical, praise). Must be in correct order and allow 3-5 sec wait time in between. Scored as 'correct' or 'incorrect'.
Child behavior - initiation of following the directive within 5 seconds of the prompt being issued. Scored as 'yes' or 'no'.

Event 1

V	3-5 WAIT	M	3-5 WAIT	P	PRAISE	C / IC
Child initiates response to teacher prompt within 5 seconds						YES / NO

Event 2

V	3-5 WAIT	M	3-5 WAIT	P	PRAISE	C / IC
Child initiates response to teacher prompt within 5 seconds						YES / NO

Event 3

V	3-5 WAIT	M	3-5 WAIT	P	PRAISE	C / IC
Child initiates response to teacher prompt within 5 seconds						YES / NO

Event 4

V	3-5 WAIT	M	3-5 WAIT	P	PRAISE	C / IC
Child initiates response to teacher prompt within 5 seconds						YES / NO

Event 5

V	3-5 WAIT	M	3-5 WAIT	P	PRAISE	C / IC
Child initiates response to teacher prompt within 5 seconds						YES / NO

Event 6

V	3-5 WAIT	M	3-5 WAIT	P	PRAISE	C / IC
Child initiates response to teacher prompt within 5 seconds						YES / NO

Event 7

V	3-5 WAIT	M	3-5 WAIT	P	PRAISE	C / IC
Child initiates response to teacher prompt within 5 seconds						YES / NO

Event 8

V	3-5 WAIT	M	3-5 WAIT	P	PRAISE	C / IC
Child initiates response to teacher prompt within 5 seconds						YES / NO

Event 9

V	3-5 WAIT	M	3-5 WAIT	P	PRAISE	C / IC
Child initiates response to teacher prompt within 5 seconds						YES / NO

VITA

Courtney Powers is a native of Metairie, Louisiana. She graduated from St. Mary's Dominican High School in 2005. She received her Bachelor of Science in early childhood education from Louisiana State University in 2009. She received her Master of Science in human ecology with a concentration in family, child, and consumer sciences: early childhood education in 2011.

As a graduate student, Courtney worked at Country Day School of Baton Rouge where she taught four-year-old children.